

REMARKS**Status of the Claims**

Upon entry of the amendment above, claims 11-41 will be pending, claims 11, 27, and 31 being independent.

Summary of the Office Action

The drawings filed by Applicants on August 28, 2001 are accepted by the Examiner, as indicated on the Office Action Summary (form PTO-326).

The documents cited in Applicants' previously filed information disclosure statement are considered by the Examiner, as indicated by the Examiner-initialled PTO-1449 form included with the Office action.

Applicants' claim of priority and receipt of the certified copy of the priority application are acknowledged by the Examiner.

Claim 20 is rejected under 35 USC §112, second paragraph, as being indefinite.

Claims 11-20 are rejected under 35 USC §102(b) as being anticipated by ELIEFF (U.S. Patent No. 4,967,454).

Claim 18 is rejected under 35 USC §103(a) as being unpatentable over ELIEFF.

Response to the Office Action**A. Miscellaneous**

Initially, Applicants express their appreciation for the Examiner's consideration of the information disclosure statement and his acknowledgement of Applicants' priority claim and receipt of the certified copy thereof.

B. Withdrawal of Rejection Under 35 USC §112, Second Paragraph

In the amendment above, claim 20 has been amended in a manner which is believed to resolve any allegation of indefiniteness. Claim 20 now specifies the "said locking means is integrated into a locking element, said locking element being slidably mounted on said loop."

Support for the subject matter of claim 20 can be found, e.g., at page 5, lines 21-22, of the original specification and means that the locking element is able to slide, which Applicants are not certain to be what the Examiner had understood.

Accordingly, in view of the amendment, withdrawal of the rejection is kindly requested.

C. Withdrawal of Rejections Under 35 USC §§102, 103

Applicants have reviewed the disclosure of ELIEFF and respectfully submit that their presently pending claims should be found to be patentable thereover. According, the withdrawal of the rejections based upon ELIEFF is requested.

Initially, Applicants note that they have amended claim 11 to call for "said gripping device comprising a frame for distributing tension of said linkage over a hand of the user."

ELIEFF discloses a lace-up device that includes a tightening zone, a lace 14, an element (a "clutch") 12 to lock the lace, and a device 16 (a "stop means"). See, e.g., column 2, lines 14-53, e.g., of ELIEFF.

The lace 14 of ELIEFF has free ends attached to the stop 16. See column 2, lines 35-39. The free ends of the lace 14 are securely attached to the stop 16, e.g., by means of a shielded knot 30, the knot being recessed in a bead 32 threaded on the free ends of the lace 14 and preferably fused or coated such that it does not untie. See, e.g., column 2, lines 39-48.

What is very important to notice in ELIEFF is that the knot 30 and/or the bead 32 make it possible to pull on the lace 14.

By contrast, in Applicants' invention, there is a frame 3 which makes it possible to pull on the linkage 15. The frame 3 is different from the knot 30 and/or from the bead 32 of ELIEFF. Further, Applicants submit that it would not have been obvious to have modified the ELIEFF disclosure in a way that would have resulted in Applicants' invention. Accordingly, reconsideration and withdrawal of the rejections based upon ELIEFF is requested.

Further, ELIEFF's device is designed for a child's shoe. See column 2, lines 44-45.

As is also obvious from the drawings of ELIEFF, the shoe is light and has to be easy to use. This means that there is no need to ensure a tight lacing. Further, the means 12 for locking in the ELIEFF device, i.e., the clutch, is not able to ensure a tight lacing. This is due to the fact that the clutch has a spring 42 which exerts pressure on the lace. See column 3, lines 2-13. Of course, the spring 42 is small and could not exert a high pressure. This means that the clutch 12 cannot ensure a tight lacing. Therefore, at least for this reason as well as for the reason that ELIEFF fails to teach or suggest a frame for distributing tension of a linkage over a hand of a user, because there is no need for same in the ELIEFF device, reconsideration and withdrawal of the rejections is requested.

Still further, Applicants' dependent claims provide additional reasons for allowance. As an example, each of claims 15 and 16 calls for the locking means to be integrated into the return elements that are positioned at the junction of the tightening zone and the loop. This would correspond, e.g., in the illustrated embodiment of Applicants' invention, to return elements 50a, 50b, at the upper end of the tightening zone. Such locking capability is provided by the interior of such return elements themselves, as explained, e.g., on page 4, lines 6-11, of the original specification. Therein, French Patent Publication No. 2 757 026 is cited, and for which U.S. Patent No. 5,956,823 is a family member. (These two documents were cited in Applicants' previously filed information disclosure statement.) ELIEFF teaches or suggests nothing that would relate to such limitation. Such feature of the invention allows for the tension of the linkage to be maintained by virtue of the user manipulating the linkage within such return elements after the tension within the tightening zone(s) has been placed at a desired level (with or without a locking element like 21 shown in the drawings).

D. Newly Added Claims

In the amendment above, Applicants have added new claims 21-41, of which claims 27 and 31 are independent.

Claim 21 calls for the frame of the gripping to space apart the two portions of the linkage. Also related to similar construction, claim 22 calls for the two portions of the linkage to be connected to the frame of the gripping device at two spaced-apart locations of the frame.

In contrast to Applicants' claims 21 and 22, in ELIEFF the two portions of the linkage between clutch 12 (beyond the uppermost lace holes 28) and the stop 16 are "dressed neatly against the laced portion of the lace as shown in FIG. 1" (column 2, lines 50-51). Further, ELIEFF explains that "it is preferred that the ends of lace 14 be joined by the stop" (column 2, lines 38-39). Of course, claim 21 calls for the linkage portions to be "spaced apart", rather than joined by the frame of the gripping element.

Claims 23 and 24 relate to certain return elements having incorporated therein the locking means of claim 11 (with claim 24 calling for the locking means to further comprise a locking element slidably mounted on the loop). As mentioned above, ELIEFF fails to teach or suggest any such feature. Certainly, ELIEFF fails to disclose a combination of return element(s) and a lace-slidable locking element.

Claim 25 specifically calls for the contact surface of the frame of the gripping device to include at least three successively arranged cavities, each of said three cavities corresponding to a respective one of three fingers of the hand of the user. In the illustrated example of the invention, these cavities are embodied by cavities 4x, 4y, 4z. ELIEFF fails to teach or suggest such a feature.

Claim 26 describes the means for locking the linkage to include a "means for maintaining said tension in said lower one of said two tightening zones independent of a tension in an upper one of said two tightening zones." Even if one were to arbitrarily designate a tightening zone in the ELIEFF device as having two tightening zones, there is no teaching or suggestion as to how or why one could maintain one zone at a tension independent of the tension in the other zone. See, e.g., page 4, lines 26-33 of Applicants' original specification.

Independent claim 27 is directed to "a lace-up device adapted to equip footwear," as is claim 11, although claim 27 includes differences with claim 11. First of all, claim 27 does not include a means-plus-function limitation (claim 11 including a "means for locking said linkage"). In addition, claim 27 calls for "said gripping device comprising a frame serving to space apart said two portions of said linkage to allow fingers of a hand of a user to extend within said loop, to engage said frame, and to pull on said linkage with said hand."

Claims 28 and 29 depend from claim 27 and include subject matter similar to that in claims 23 and 24, respectively.

Claim 30, also depending from claim 27, includes, inter alia, subject matter relating to the aforementioned independent maintenance in tension in first and second tightening zones.

Claims 31-41 are directed to an "article of footwear" which includes a lace-up device.

In addition to other limitations, independent claim 31 calls for "a linkage tension maintaining structure to maintain said tightening tension on said linkage in said tightening zone," (rather than a "locking means", e.g.) and for the "gripping device" to comprise "a frame serving to space apart said two portions of said linkage to allow fingers of a hand of a user to extend within said loop, to engage said frame, and to pull on said linkage with said hand."

Claims 32 and 33 depend from claim 31 and include subject matter similar to that in claims 23 and 24, respectively.

Claim 34 calls for the upper of the article of footwear to be a "high upper" (see, e.g., page 3, line 11 of Applicants' original specification, as well as the drawings), "including a lower portion extending to an area of an ankle of a foot and an upper portion extending above the lower portion." Of course, ELIEFF's disclosure is directed to a lower upper, i.e., one that does not protect the ankle.

Claim 35 depends from claim 34 and further calls for the tightening zone to comprise lower and upper zones for the lower and upper portions of the upper, with the lower and upper

portions of the upper being "separated by at least one return element positioned on each of respective ones of said portions of said upper."

Claim 36 depends from claim 35 and calls for the "linkage tension maintaining structure" to comprise "means for maintaining a tension in said lower tightening zone independent of a tension in said upper tightening zone." (emphasis added)

Claim 37 depends from claim 36 and specifies the linkage as comprising "one and only one lacing extending through said lower and upper tightening zones."

Somewhat similarly, claim 38, also depending from claim 36, calls for the linkage to be "continuous" from the bottom of the lower tightening zone to the top of the upper tightening zone."

Claim 39, also depending from claim 36, more specifically calls for the lower tightening zone to extend "from a metatarsophalangeal articulation area to an ankle area." (See, e.g., page 3, lines 11-13).

Claim 40 depends from claim 31 and includes subject matter relating to the tightening zone comprising at least two zones separated by at least one return element positioned on each of respective ones of the portions of the upper, and the "linkage tension maintaining structure" comprising "means for maintaining a tension in a first of said two tightening zones independent of a tension in a second of said two tightening zones."

Finally, claim 41, depending from claim 31, calls for the frame of the gripping device to be rigid.

SUMMARY AND CONCLUSION

The grounds of rejection advanced in the Office action have been addressed and are believed to be overcome. Reconsideration and allowance are respectfully requested in view of the amendment and remarks above.

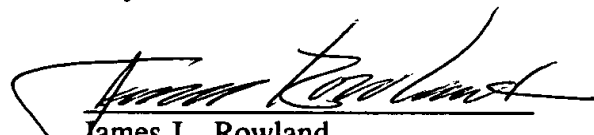
Any amendments to the claims presented above, which have not been specifically noted to overcome a rejection based upon prior art, should be considered to have been made for a purpose unrelated to patentability, which include cosmetic amendment(s), and no estoppel should be deemed to attach to such amendments.

A check is enclosed for payment of a claim fee. No additional fee is believed to be due at this time. However, the Commissioner is authorized to charge any fee required for acceptance of this reply as timely and complete to Deposit Account No. 19-0089.

Further, although no extension of time is believed to be necessary at this time, if it were to be found that an extension of time were necessary to render this response timely and/or complete, Applicants request an extension of time under 37 CFR 1.136(a) in the necessary increment(s) of month(s) to render this reply timely and/or complete and the Commissioner is authorized to charge any necessary extension of time fee under 37 CFR 1.17 to Deposit Account No. 19-0089.

Any comments or questions concerning this application can be directed to the undersigned at the telephone or fax number given below.

Respectfully submitted,
Guy AZAM et al.



James L. Rowland
Reg. No. 32,674

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GREENBLUM & BERNSTEIN, P.L.C.
1950 Roland Clarke Place
Reston, VA 20191

(703) 716-1191 (telephone)
(703) 716-1180 (fax)

VERSION OF AMENDMENTS WITH MARKINGS TO SHOW CHANGES MADE**In the Specification**

See attached substitute specification and "marked-up" version of the substitute specification.

In the Claims

11. (Amended) A tight lace-up device adapted to equip footwear, the footwear including two portions to be brought closer together with said device, said device comprising:

a tightening zone comprising return elements positioned on said portions;

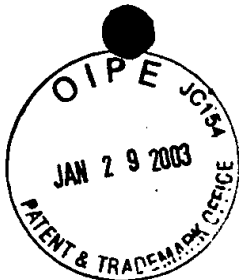
a linkage including two ends, said linkage connecting, along a predetermined path [direction of travel], at least two return elements arranged on different respective ones of said footwear portions, said linkage forming a loop outside said tightening zone;

a means for locking said linkage;

a gripping device arranged on said linkage in an area of said loop, said gripping device enabling a user to pull efficiently on said linkage with at least one hand, said gripping device comprising a frame for distributing tension of said linkage over a hand of the user.

12. (Amended) A lace-up device according to claim 11, wherein said frame is rigid [gripping device comprises a rigid frame for distributing tension of said linkage over a hand of the user].

20. (Amended) A lace-up device according to claim 11, wherein said locking means is integrated into a locking element, said locking element being [of said locking means that is] slidably mounted on said loop.



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MARKED-UP VERSION OF SUBSTITUTE SPECIFICATION

TITLE OF THE INVENTION

LACE-UP TIGHTENING DEVICE FOR AN ARTICLE OF FOOTWEAR, AND
AN ARTICLE OF FOOTWEAR EQUIPPED WITH SUCH DEVICE
[TIGHT SHOE LACE-UP DEVICE]

INVENTORS

Guy AZAM
Jean-Bruno DANEZIN
Eric PIERRE
Bruno BORSOI

P21314

LACE-UP TIGHTENING DEVICE FOR AN ARTICLE OF FOOTWEAR, AND
AN ARTICLE OF FOOTWEAR EQUIPPED WITH SUCH DEVICE
[TIGHT SHOE LACE-UP DEVICE]

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The invention relates to a tight lace-up device using a lace-type linkage and adapted to equip an article of [a] footwear used, in particular, but in a non-limiting fashion, in sporting activities. The invention also relates to such article of footwear equipped with such device. Tight [This tight] lacing, according to the invention, is more specifically adapted to shoes whose upper is reinforced, and which are used in particular for snowboarding, in-line roller skating, alpine skiing, mountain skiing and telemark skiing, ice skating, etc.

2. Description of Background and Relevant Information

[0002] To [properly] tighten a shoe of the aforementioned type properly, it is necessary to tie the lace tightly. In addition, using a lace-type tightening makes it possible to preserve a lightweight and inexpensive system, as compared to the other mechanical locking means, such as buckles. However, to obtain a tight lacing, it is necessary to reduce the friction of the lace in the lace returns. The improved sliding occurs in particular by reducing the section of the lace, which reduces the friction contact surface. Nevertheless, the small section of the lace tends to cause a painful shearing effect in the hand, and this prevents the user from applying enough tension in order to efficiently tighten the shoe.

[0003] French Application Publication No. [The document FR] 2 752 686 proposes a first alternative by describing a lace having variable sections. The central portion is small in diameter so as to slide easily in the returns, and the ends of the lace have larger sections in order to provide greater comfort for the hands. However, even though this system makes it possible to tension the lace correctly, it does not make it possible to maintain the tension due to a locking of the lace by a knot. Indeed, during the time necessary required for tying the knot, the user is forced to release the tension in the lace. Furthermore, the system is expensive to implement, for it requires specific means for manufacturing the lace.

[0004] French Application Publication No. [The document FR] 2 706 743 describes a lace-up device where the lace, having a small cross section, passes in returns, minimizing the friction and forms a loop. The lace is locked by an independent locking element that slides along the lace outside the lacing zone. The locking element makes it possible to maintain the tension in the lace. However, the user cannot apply a substantial tension in the lace. Indeed, the user is forced to grab the loop of the lace with at least one finger and to pull on the lace [thereon], which quickly shears the skin due to the small diameter of the lace.

SUMMARY OF THE INVENTION

[0005] One of the objects of the present invention is to propose a lace-up device for an article of [a] footwear using a linkage that makes it possible to ensure a tight lacing, while preserving the user's comfort during the tightening phase.

[0006] Another object of the invention is to propose an inexpensive lace-up device that does not require the use of specific means to manufacture the linkage.

[0007] To achieve these objects, the lace-up device according to the invention includes a linkage that connects, along a predetermined path [travel], at least two return elements arranged on different portions of the article of footwear to be brought closer together, and which forms a loop located outside the tightening zone. The linkage is equipped in the area [at the level] of the loop with a gripping device that enables the user to pull efficiently [pull] on the linkage with at least one hand. This gripping device includes a rigid frame, making it possible to distribute the tension of the linkage over the hand. In addition, this lace-up device includes a locking mechanism [means] integrated into the return elements that is [are] positioned at the junction of the lacing zone and of the loop. Thus, the user can maintain the tension in the linkage and, therefore, in the lacing zone, during the locking.

[0008] In a first embodiment, the gripping device is positioned at one of the ends of the tightening zone.

[0009] In a second embodiment, the gripping device is positioned perpendicular to the tightening zone.

BRIEF DESCRIPTION OF DRAWING

[0010] The invention will be better understood and other advantages thereof will become apparent from the description that follows, with reference to the annexed drawings, whereby the [. The] description illustrates, by way of non-limiting examples, certain preferred embodiments. The drawings include the following views:

FIG. [Figure] 1 shows a side view of a footwear equipped with the lace-up device according to the first embodiment in a first tightening phase;[.]

FIG. [Figure] 2 shows a side view of the footwear equipped with the lace-up device according to the first embodiment in a second tightening phase;[.]

FIG. [Figure] 3 shows a front view of a detail of the gripping device ;[.]

FIG. [Figure] 4 shows a three-quarter top view of the lace-up device according to the second embodiment.

DETAILED DESCRIPTION OF THE INVENTION

[0011] In FIG. [Figure] 1, the article of footwear CH shown is a snowboard boot. The [Of course, the] invention applies to any type of boot whose flexible upper is reinforced either to increase the stiffness in bending of the upper, or to protect the foot and ankle from impacts and external attacks. This type of boot is found in sports such as snowboarding, in-line roller skating, and ice skating, for example.

[0012] The invention also applies to boots provided with an external rigid shell made of plastic, for example, and used, in particular, for alpine skiing, snowboarding, in-line roller skating, ice skating, mountain skiing, or telemark skiing, for example.

[0013] The article of footwear CH includes an upper O comprising two portions 12a and 12b adapted to be brought closer together by a [the] lace-up device. This lace-up device generally includes a tightening zone 16, which here is divided into two zones 16e and 16f, zone 16e being a lower tightening zone and zone 16f being an upper tightening zone. In a conventional and known manner, the tightening zone 16 comprises return elements 50a-54a and 50b-54b positioned on each of the two portions 12a and 12b, respectively.

[0014] A linkage 15, such as a lace or cable, connects at least two return elements 50a and 50b along a predetermined length of travel. The [Of course, the] linkage 15 can advantageously connect all of the return elements to complete the tightening. In addition, the linkage 15 forms a loop 2 located outside the tightening zone 16.

[0015] To maintain the tension in the linkage 15, the lace-up device also includes a mechanism [means] 20 for locking, or blocking, the linkage 15.

[0016] FIG. [Figure] 1 more specifically illustrates a [the] first tightening phase of the device, which is adapted to tighten a boot with a high upper. This phase ensures the tightening of the lower tightening zone 16e, which extends approximately from the metatarsophalangeal articulation up to the ankle, by making it possible to [firmly] hold the instep firmly in the article of footwear CH. The lower tightening zone 16e includes a series of return elements 53a and 53b which advantageously specially adapted to make [have an adapted device making] it possible to reduce the friction of the linkage 15 in the [said] return elements.

[0017] Despite the use of specially adapted return elements as described in French Application Publication No. [the document FR] 2 706 743, tests have shown that it is preferable to limit to four, for example, the number of return elements 53a and 53b arranged on each of the portions 12a and 12b for each tightening zone 16e and 16f in order to optimize the tightening.

[0018] The upper end of the lower tightening zone 16e is demarcated [ended] by two return elements 52a and 52b, arranged on each of the portions 12a and 12b of the upper, which possibly have specific functions which will be detailed subsequently, and which separate the two tightening zones 16e and 16f.

[0019] The linkage 15, which extends from [comes out of] the return elements 52a and 52b, forms a loop 2 that includes a gripping device 1 arranged on the linkage 15. This gripping device 1 enables the user of the article of footwear CH to [easily] grab the loop 2 easily[.] and, likewise, to [easily] exert a generally upward force F1 on the loop 2 easily. This force F1 generates a tension in each strand of the linkage 15 that contributes to the tightening power of the [present] lace-up device by bringing the two portions 12a

and 12b of the upper of the article of footwear closer together. However, since the tension in each strand of the linkage 15 corresponds substantially to one half of such [said] force F1, it is important that the gripping device 1 ensure the user's comfort during the tightening.

[0020] To achieve this object, the gripping device 1 comprises a rigid frame 3. This rigidity makes it possible to distribute the tension of the linkage 15 over the user's hand by limiting the shearing effect of the linkage on the skin. Thus, the more the pain on the hand is reduced, the more firmly the user can pull on the gripping device 1.

[0021] The rigid frame 3 can be advantageously made out of a material having a certain bending strength, in particular thermoplastic materials such as polyamide, polypropylene, and according to an adapted geometry that promotes greater inertia along the direction of force F1.

[0022] Once the tension is exerted in the linkage 15, it is necessary to maintain this tightening tension in order to be able to release the gripping device 1. This function is ensured by a locking mechanism [means] 22 that is integrated into the return elements 52a and 52b. These elements 52a and 52b simultaneously ensure a sliding function in one direction, and a locking, or blocking, function in another direction. The return elements 52a, 52b, can be constructed as described in French Application Publication No. [FR] 2 757 026.

[0023] To combine these two functions, the return elements 52a and 52b can be suitably oriented on the upper O, such that the force F1 on the linkage 15 makes it possible to slide the linkage in the return elements 52a and 52b, and also to exert a reverse-locking action. But the return elements 52a and 52b can also be oriented so as to promote the sliding along the direction of the force F1. Then, [then,] once the force F1 has been applied, the user exerts a force F2 oriented substantially forward. This force

F2 changes the orientation of the linkage 15 in the return elements 52a and 52b and makes it possible to use the [said] return elements 52a and 52b in their locking function.

[0024] To facilitate the sequence of the actions of tightening and loosening the lower tightening zone 16e, the return elements 52a, 52b, 53a, and 53b, which are located in the lower tightening zone 16e, include guiding means adapted to prevent the linkage 15 from escaping during the loosening. One way to implement these guiding means consists of using return elements which include a channel from which the linkage 15 cannot escape unexpectedly.

[0025] FIG. [Figure] 2 shows the second and last tightening phase of the footwear CH, which is still a boot adapted to snowboarding. This tightening phase makes it possible to tighten the upper tightening zone 16f by bringing the portions 12a and 12b of the upper O closer together. The [present] lace-up device of the invention, therefore, makes it possible to separate the tightenings and their intensities for the lower tightening zone 16e and the upper tightening zone 16f. Indeed, the tightening of the upper tightening zone 16f does not have any effect on, that is, is independent of, the tightening of the lower tightening zone 16e due to the locking function of the linkage 15 which is integrated into the return elements 52a and 52b.

[0026] To undertake the second tightening phase, the user first positions the linkage 15 manually in the return elements 51a and 50a and their counterparts, located on the opposite portion 12b. The user criss-crosses [users crisscrosses] the linkage 15 in a known fashion by going upward from the return element 52a [up] to the return element 50a. To be able to perform this manual operation, the return elements 50a, 50b, 51a, and 51b, located in the upper tightening zone 16f, are of the hook type. In other words, they are open so as to retain the linkage 15 in the direction that brings the two portions 12a and 12b of the upper O closer together.

[0027] Once the linkage 15 is positioned, the user pulls, along a substantially upward force F3, on the gripping device 1 which is positioned on the linkage 15 in the area [at the level] of loop 2. This action tensions the linkage 15 which brings the two portions 12a and 12b of the upper O closer together, in the area [at the level] of the upper tightening zone 16f. The tightening tension is maintained in this zone 16f due to a means for locking the linkage 15.

[0028] This locking can be obtained in two different ways. First, the return elements 50a and 50b, which are positioned at the end of the tightening zone 16, and at the junction of the upper tightening zone 16f and the loop 2, integrate a locking means 23. This locking means is substantially similar to the locking means 22 arranged on the return elements 52a and 52b and described previously. Similarly, the user can lock the linkage 15 by pulling along the direction of the force F3 if the return elements 50a and 50b are arranged on the upper O along a specific orientation. Conversely, the user pulls on the gripping device 1 with the force F3, then displaces the [said] device 1 forwardly along a direction F4 to ensure the locking of the linkage 15 according to a previously described mechanism.

[0029] Second, the locking means 20 can be integrated into an independent locking element 21 that is slidably mounted on the loop 2. To perform the locking, the user pulls on the gripping device 1 along the direction F3, then displaces the locking element 21 along a direction Δ that brings the locking element 21 closer to the return elements 50a and 50b. Preferably, the locking [blocking] element 21 is slidably mounted concurrently on the two strands of the loop 2. The [Of course, the] locking means 20 can be embodied as [obtained by] two locking elements sliding on each of the strands of the loop 2, respectively. In this case, the user must displace the two locking elements to lock the linkage 15.

[0030] Moreover, the two aforementioned locking devices can be combined for increased safety against an ill-timed loosening, which may occur on this type of boot, which can be [that are] subject to substantial forces during the sporting activity. FIG. [Figure] 2 shows this combination with locking means 23 integrated into the return elements 50a and 50b and the locking element 21 mounted on the loop 2 of the linkage 15.

[0031] The tests conducted have shown the interest of using a flexible and substantially non-stretching linkage 15. The flexibility is necessary in the travel imposed by the position of the return elements, and the non-stretching ability makes it possible to limit the elongation of the linkage 15, in particular in the area [at the level] of the loop 2, during the tightening.

[0032] Indeed, the tension obtained by the rigid frame 3 of the gripping device 1 is so substantial that, in the case of a conventional lace, or even a string, the user would spend his energy in untying the lace instead of bringing the two portions 12a and 12b closer together. The best results were obtained with a linkage 15 obtained with a linkage made of kevlar or aramid, and whose outer diameter is between 2 and 4 mm.

[0033] FIG. [Figure] 3 shows a detail of the lace-up device in the area [at the level] of the gripping device 1 and its rigid frame 3. This frame 3 comprises a contact surface 4 which is complementary of at least three fingers 25x, 25y, and 25z of the hand M. This contact surface 4 comprises three cavities 4x, 4y, and 4z which assume the morphology of the fingers 25x, 25y, and 25z, respectively, when folded around the frame 3. Tests have shown that to obtain a more powerful tightening, the fingers used preferably are the forefinger, second finger, and third finger.

[0034] In addition, in the preferred embodiment shown, the frame 3 also serves to close the loop 2 constituted by the linkage 15. The gripping device 1 includes hooking

zones, or connection arrangements, 5c and 5d that are adapted to cooperate with the two ends, or end portions, 15c and 15d, respectively, of the linkage 15. The connection arrangements [hooking means] 5c, 5d can be constituted by a wall 100, perpendicular to the linkage 15, which is integral with the rigid frame 3. A hole 101 in which the end 15c of the linkage 15 passes is provided in this wall 100. This end 15c is equipped with a locking means, such as a knot 102 whose diameter is greater than the diameter of the hole 101.

[0035] As [Of course, as] shown in FIG. [Figure] 4, the linkage 15 can also extend right through the frame 3. However, like the gripping device shown in FIG. 3, the frame 3 serves to separate, i.e., to space apart, the linkage portions that are connected to, or pass through, the frame to allow the fingers of the hand to extend within the loop 2. The ends, or end portions, 15c and 15d of the linkage 15 are connected to return elements 54a and 54b located substantially at the ends of the tightening zone 16. However, in this embodiment, the loop 2 which includes the frame 3 is not located at one of the ends of the tightening zone 16. The loop 2 is located outside the tightening zone 16, but extends substantially perpendicular to the plane defined by the tightening zone 16 so as to divide the [said] zone 16 into two tightening sub-zones 105 and 106.

[0036] Furthermore, the gripping device can be provided with an improvement not shown. In this improvement, the gripping device includes a fastening means complementary of the article of footwear which makes it possible to store the [said] gripping device on the article of footwear. This fastening means can advantageously be of the self-gripping type, or in the form of a snap-fastener. The footwear can also be provided with a pocket or a strap forming a loop in which the gripping device could be housed when it is out of the tightening and loosening phases. In addition, the gripping device can advantageously include comfort elements constituted of a softer material than that of the frame, and positioned in the area [at the level] of the contact surface adapted to be in contact with the fingers of the hand.

[0037] The [Of course, the] present invention is not limited to the embodiments described hereinabove, which are provided for guidance only, but encompasses all similar or equivalent embodiments.

WHAT IS CLAIMED IS:

ABSTRACT OF THE DISCLOSURE

A lace-up device for tightening an article of footwear, providing for the tying of the lacing without causing discomfort to the user's hands, as well as to the article of footwear equipped with such device. The lace-up device includes a gripping mechanism arranged on the linkage in the area of a loop formed by the lacing outside the tightening zone. The gripping device includes a rigid frame, making it possible to distribute the tension of the lacing over the hand of the user.

[The present invention relates to a lace-up device, adapted to equip a footwear (CH), which makes it possible to tie the lace tightly without bruising the hands.

The lace-up device includes a gripping device (1) arranged on the linkage (15) at the level of the loop (2) formed by the linkage (15) outside the tightening zone (16).

The gripping device (1) comprises a rigid frame (3) making it possible to distribute the tension of the linkage (15) over the hand (M) of the user.

Figure of the abstract: Figure 1]